

Rhodora

JOURNAL OF THE
NEW ENGLAND BOTANICAL CLUB.

Conducted and published for the Club, by

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Vol. II.

October, 1909.

No. 130.

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Boston, Mass.
1052 Exchange Building.

||| Providence, R. I.
Preston and Rounds Co.

RHODORA.—A monthly journal of botany, devoted primarily to the flora of New England. Price \$1.00 per year (\$1.25 to all foreign countries including Canada); single copies 15 cents. Volume 1, \$2.00, Vol. 2, \$1.50. All remittances by check or draft, except on Boston or New York, must include ten cents additional for cost of collection. Notes and short scientific papers, relating directly or indirectly to the plants of the northeastern states, will be gladly received and published to the extent that the limited space of the journal permits. Forms will be closed five weeks in advance of publication. Authors (of more than one page of print) will receive 25 copies of the issue in which their contributions appear. Extracted reprints, if ordered in advance, will be furnished at cost.

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No. 130.

AMERICAN CRATAEGI IN THE SPECIES PLANTARUM OF LINNAEUS.

C. S. SARGENT.

SINCE the publication last year in RHODORA (x. May, 1908) of Mr. Eggleston's notes on the species of Crataegus described by Linnaeus I have had the opportunity to examine again the specimens of Crataegus in the Plukenet Herbarium at the British Museum and the specimens of this genus preserved in Linnaeus's own herbarium.

Three of the four species of Crataegus described by Linnaeus in the first edition of the *Species Plantarum* are what may be called book species, that is there is no evidence that Linnaeus had ever seen a specimen of these plants when his descriptions were published in 1753, these having evidently been based on the descriptions and figures of earlier authors. Of the fourth species, *Crataegus viridis*, there is a specimen in the Linnaean Herbarium collected by Clayton in Virginia which Linnaeus may have seen before his description was written. Several years ago I made out that this specimen represented the plant described later by Elliott as *Crataegus arborescens*, although at that time this species had not been rediscovered in Virginia. It is interesting to report, therefore, that *Crataegus viridis* Linnaeus (*C. arborescens* Elliott) was found by Mr. Rehder last summer on the bank of the Blackwater River near Zuni in southeastern Virginia.

Crataegus Crus-galli was described by Linnaeus from Plukenet's figure and description. The specimen which appears to have served in part, at least, as the subject for Plukenet's figure (*Alm. Bot.* 149, t. 46, f. 1) is preserved in his herbarium. It is a young shoot without flowers and fruits, and although I suspect that it is not the plant which is now usually considered to be *Crataegus Crus-galli*, it is impossible

to say what it is except that it is from one of the Crus-galli Group of species. The specimen labeled *Crataegus Crus-galli* in Linnaeus's Herbarium is also only a barren shoot. It was collected by Kalm and no locality is given. It is certainly one of the Crus-galli Group, and probably represents a different species from the specimen in the Plukenet Herbarium. In spite of the doubt which these specimens raise on the identity of *Crataegus Crus-galli* of Linnaeus, it does not seem desirable or necessary to abandon his name as no confusion is likely to occur by retaining it.

It is not possible to guess even at the plant described by Linnaeus as *Crataegus tomentosa*. His species was based on the specimen collected by Clayton in Virginia and, unfortunately, this is one of the few of Clayton's specimens which is not preserved in the British Museum. On the sheet labeled *Crataegus tomentosa* in Linnaeus's Herbarium there are two specimens collected by Kalm without locality. One is evidently what is now generally called *Crataegus tomentosa* and the other is one of the thick-leaved Tomentosae species. It is of interest, perhaps, that there is a thorn on the first of these specimens as *Crataegus tomentosa* is usually thornless, although "ramis spinosis" appears in Linnaeus's description of his *Crataegus tomentosa*. As no confusion is likely to arise from retaining the name of *Crataegus tomentosa* for the plant now generally considered to be that species, there appears to be no good reason for abandoning the name.

Crataegus coccinea was established by Linnaeus on Plukenet's figure (*Alm. Bot.* t. 46, f. 4.). The figure well represents one of the three specimens so numbered preserved in Plukenet's Herbarium. The numbers published by Plukenet have been written below the specimens of his herbarium by some one now unknown and perhaps after the collection had become the property of the British Museum. Under the specimen which is the type of Linnaeus's *Crataegus coccinea* there is a note by Robert Brown confirming the determination. Mr. Eggleston's statement that the type of *Crataegus coccinea* was an unnumbered specimen found by Mr. Britten is not clear. All the specimens in Plukenet's Herbarium are numbered and Mr. Britten assures me that he has no recollection of having made such a statement. It is probable, however, that the fruit that he sent to Mr. Eggleston is from the specimen represented on plate 46, f. 4, as one of the seven fruits figured by Plukenet is missing. The leaves of this specimen are only slightly villose on the upper surface; the fruit is

glabrous and the pedicels are slightly hairy; and it cannot, as Mr. Eggleston has suggested, represent *Crataegus modesta*. The specimen is thornless and the detached thorn in the Plukenet figure may have been taken from one of the two other specimens in the Plukenet Herbarium which the same unknown person has referred to the plant figured on t. 46, f. 4. The thorns on one of these specimens are slightly thicker and on the other they are more recurved than that figured by Plukenet. These three specimens in the Plukenet Herbarium referred to t. 46, f. 3, certainly all represent different species either in the Molles or Lobulatae Groups, and I am unable to identify any of them. The matter is further confused by the fact that Linnaeus also referred to his *Crataegus coccinea* the plant figured in the *Hort. Angl.* t. 13, f. 1, which is *Crataegus cordata*. The specimen labeled *Crataegus coccinea* in the Linnaean Herbarium was from a plant cultivated in the Upsala Garden, and, being unable to determine any of Plukenet's specimens, it was this specimen that I formerly considered the type of *Crataegus coccinea* and referred to it a common species of the New England coast and the St. Lawrence Valley (see *Bot. Gazette*, xxxi. 11). Aiton's specimen of *Crataegus coccinea* in the British Museum is a barren shoot of some Molles species.

Under Rule 51 of the Vienna code it is provided in Section 4 that every one should refuse to adopt a name "when the group which it designates embraces elements altogether incoherent or when it becomes a permanent source of confusion and error." This is the case of *Crataegus coccinea*. Certainly the type of *Crataegus coccinea* cannot be determined and a large number of different species have at different times been called *Crataegus coccinea*. It appears therefore desirable to abandon the name entirely and to find a new name for the plant figured as *Crataegus coccinea* in *The Silva of North America* and in the *Manual of North American Trees*. A glabrous form of this which I have called *Crataegus coccinea rotundifolia* was first described in 1785 by Moench (*Bäume Weiss.* 29, t. 1) as *Crataegus rotundifolia*, which would therefore be the name of the species if the hairy and the glabrous forms are considered to belong to one species; and the hairy plant which I have described as *Crataegus coccinea* may then become ***Crataegus rotundifolia* var. *pubera*.**

THE STATUS OF ARENARIA STRICTA IN NEW HAMPSHIRE.

M. L. FERNALD.

AMONG the specimens which came to the New England Botanical Club in the transfer of the herbarium of the Middlesex Institute to the Club was a sheet of *Arenaria* with the label "*Arenaria Groenlandica* Spreng. Mt. Washington, Aug. 7, 1881. W. H. Manning." The sheet which, besides the complete label, bears the small penciled field-label of Mr. Manning, has upon it a single flowering branch which is unquestionably *A. stricta* Michx. Although *A. stricta* is very rarely met east of the calcareous regions of western New England and diligent search by many active botanists has failed to show other evidence of it upon Mt. Washington, the known occurrence in the White Mountain area of a few limited calcareous outcrops and the recent discovery there of local plants formerly unknown in the region made it advisable to give Mr. Manning's specimen due record in the seventh edition of Gray's Manual.

Recently, however, in looking over a package of specimens from outside New England which came from the collections of the Middlesex Institute, I have found a sheet which throws new light upon the matter. This sheet has Mr. W. H. Manning's field-label: "*Arenaria stricta*. Glens Falls, N. Y. June 22, 1881. W. H. M."; but the specimen beside which the label is glued is very characteristic *A. groenlandica*! It is quite evident, therefore, that the record of *A. stricta* from Mt. Washington arose through a transposition of labels; for *A. groenlandica* is one of the commonest plants of Mt. Washington, but in New York is known almost exclusively from the highest summits of the Adirondack, Catskill, and Shawangunk Mountains; and *A. stricta*, otherwise unrecorded from the White Mountains, is in New York common "particularly on the banks of rivers and lakes; northern and western counties."¹

Although *Arenaria stricta* is thus withdrawn from the list of Mt. Washington plants, there is a station for it at the southwestern edge of the White Mountain area which should be recorded. This colony on

¹ Torr. Fl. N. Y. i. 95 (1843).

"the summit of a hill, Holderness, N. H." was discovered in July, 1891, by Dr. R. C. Manning, Jr., who brought plants to the late Sereno Watson. These specimens are now preserved in the Gray Herbarium and, so far as the writer is informed, represent the only known station for the species in New Hampshire.

GRAY HERBARIUM.

NOTES ON NEW ENGLAND HEPATICAE,—VII.

ALEXANDER W. EVANS.

THE eight species discussed in the present paper include five distinct additions to the New England flora. The three remaining species have already been noted from New England, but their records have been either uncertain or incomplete. The North American species of *Cephaloziella*, two of which are mentioned below, are in need of further study, and it is probable that other members of this genus will eventually be detected in New England. It is difficult, however, to treat them fully at the present time because most of them occur also in Europe, and European writers still disagree about their limits and relationships.

1. *METZGERIA FURCATA* (L.) Dumort. Recueil d'Obs. sur les Jung. 26. 1835. *Jungermannia furcata* L. Sp. Plant. 1136. 1753. *Metzgeria glabra* Raddi, Mem. Soc. Ital. delle Sci. in Modena **18**: 45. pl. 7, f. 1. 1818. On rocks and trees. Maine: Buckfield (*J. A. Allen*); Cumberland (*E. B. Chamberlain*). New Hampshire: Cornish (*Miss Haynes*); Jackson (*A. W. E.*). *Metzgeria furcata* was considered a common North American species until the publication of Lindberg's Monographia Metzgeriae in 1877.¹ The earlier writers accepted it in a broad sense and referred to it all the northern forms of the genus which were distinguished from *M. pubescens* by being destitute of cilia on the antical surface of the thallus. According to Lindberg the old *M. furcata*, as thus understood, was an aggregate and

¹ Acta Soc. Faun. Fl. Fenn. **1**: 1–48. 2 pl. 1877.

he separated off, as distinct species, *M. conjugata*,¹ *M. hamata*, and *M. myriopoda*, largely on the basis of characters drawn from the structure of the thallus, the distribution and peculiarities of the marginal and postical cilia, and the nature of the inflorescence. He restricted the name *M. furcata* to what he described as the commonest of all European hepaticae but stated that he had never seen typical specimens of this species from North America. To *M. conjugata*, on the other hand, the only one of his new species which need now be considered, he ascribed a wide distribution on both sides of the Atlantic. Since this time the majority of writers, including such recent authorities as Stephani² and C. Müller,³ have accepted Lindberg's statements with regard to the absence of *M. furcata* from North America and have consequently considered *M. conjugata* as our common representative of the genus. In 1892, however, Miss Boatman⁴ recorded *M. furcata* from various localities in North America, extending from North Conway, New Hampshire (*James*), into Mexico, and Underwood⁵ soon afterwards published similar observations independently. On the basis of these records the species ought properly to have been included in the writer's Preliminary List of New England Hepaticae,⁶ but it was omitted because Underwood himself expressed some doubt as to the correctness of the determinations, most of which were based on thallus characters only. Apparently the specimens quoted above represent the species clearly, so that *M. furcata* may now be definitely reinstated as a member of our flora. Equally clear specimens have been examined also from Indian Brook, Cape Breton (*G. E. Nichols*), and from Onteora Mountain, New York (*Miss Vail*).

All writers agree that *M. furcata* and *M. conjugata* are very closely related. In both species the costa presents the same type of structure, being bounded above by two rows of cortical cells and below by from three to five rows. Lindberg finds the most important difference between the two plants in the inflorescence, *M. furcata* being dioicous and *M. conjugata* autoicous, but he also calls attention to differences in the structure of the thallus, to which he attaches considerable importance. In *M. furcata*, the less robust of the two, the thallus is said to be

¹ This species was first published in *Acta Soc. Sci. Fenn.* **10**: 495. 1875.

² *Bull. de l'Herb. Boissier* **7**: 941. 1899.

³ *Rabenhorst's Kryptogamen-Flora* **6**: 349. 1908.

⁴ *Bull. De Pauw Sci. Assoc.* **1**: 3. 1892.

⁵ *Bull. Torrey Club* **19**: 301. 1892.

⁶ *RHODORA* **5**: 170-173. 1903.

plane, the marginal cilia to occur singly, and the postical surface of the wings to be usually pilose. The marginal cilia are further distinguished by being slightly displaced to the postical surface and therefore not clearly visible from above. In *M. conjugata*, on the other hand, the thallus is said to be convex, the marginal cilia to occur frequently in pairs, and the postical surface of the wings to be practically free from cilia. Unfortunately, as Limprecht and others emphasize, most of these vegetative characters are subject to a good deal of variation, and it is not infrequent to find specimens in which the cilia are either sparingly developed or absent altogether. Even when present they do not always show the peculiarities of arrangement detailed above. Marginal cilia in pairs, for example, may occur in combination with scattered postical cilia, and wings of the thallus which are smooth on both surfaces may show marginal cilia borne singly. The position of these unpaired cilia, moreover, may also vary, being sometimes truly marginal and sometimes displaced to the postical surface. On account of the inconstancy of these vegetative characters Limprecht¹ was inclined to look upon *M. conjugata* as nothing more than a robust and normally developed form of *M. furcata*, due to a favorable environment, and Boulay,² still more recently, was unwilling to accord it more than subspecific rank. Most writers, however, accept both species without question, and this seems the wisest course to pursue since specimens with sexual branches usually show the specific characters clearly. The impossibility of determining all sterile material is by no means unusual in other genera of the hepaticae.

Although certain of the characters already mentioned are seen to be untrustworthy, *M. furcata* often produces peculiar organs of vegetative reproduction, which enable us to determine sterile specimens without difficulty. These organs have long been known but it is only lately that they have been at all emphasized from a taxonomic standpoint. They are in the form of marginal gemmae, or propagula, and are ovate to ligulate in outline according to the stage of their development. They are at first only one cell thick throughout but usually acquire a median costa sooner or later. The gemmae are frequently developed in great abundance, and Goebel³ considers their production to be a direct result of unfavorable conditions. Lindberg described these

¹ Cohn, Krypt.-Flora von Schlesien 1: 441. 1876.

² Musc. de la France 2: 170. 1904.

³ Flora 83: 69–74. 1898.

marginal gemmae clearly for *M. furcata* but made no allusion to them in his description of *M. conjugata*, thus implying that they did not occur in this species. Goebel¹ goes still farther; he associates marginal "adventive branches" definitely with *M. furcata*, and says that *M. conjugata* is characterized by the occasional production of gemmae of an entirely different type. Miss Boatman, to be sure, describes marginal gemmae for *M. conjugata*, but her statements have not been confirmed by subsequent writers and it seems probable that her descriptions were not drawn from the true *M. conjugata*. On the whole the evidence at present appears to indicate that the marginal gemmae of *M. furcata* yield important differential characters, and it seems safe to assume that such gemmae do not occur in *M. conjugata*. The writer hopes to discuss the vegetative reproduction of *Metzgeria* more fully in another connection.

2. **Metzgeria crassipilis** (Lindb.) sp. nov. *Metzgeria furcata*, subsp. *Metzgeria crassipilis* Lindb. Acta Soc. Faun. Fl. Fenn. 1: 42, 1877. On rocks. Vermont: Lake Dunmore (*W. G. Farlow*). Connecticut: New Haven (*D. C. Eaton*); Orange (*J. T. Phinney*). Although Lindberg, as already noted, saw no specimens of typical *M. furcata* from North America, he described a peculiar plant from the eastern United States under the above name, including it under *M. furcata* as a subspecies. He was able to study two specimens of this plant, one from Laurel Hill, Pennsylvania (*Sullivant*), and the other from Ben Lomond, Warren County, Tennessee (*Fredriksson*). Neither of these specimens has been accessible to the writer, but Lindberg's description is so detailed and so clear that there can be but little doubt as to the correctness of the above determinations. For some strange reason *M. crassipilis* has been completely overlooked or ignored since its original publication but it is amply distinct from *M. furcata*, and Lindberg would undoubtedly have described it as a distinct species if he had had a more liberal supply of material at his disposal. It has a fairly wide distribution and the following localities, outside of New England, may also be recorded. New York: Chilson Lake (*Mrs. Smith*); Little Moose Lake (*Miss Haynes*); Shandakan (*Miss Miller*). West Virginia: Seebert and Warntown (*J. L. Sheldon*). Virginia: Nick's Creek and Walker's Mountain (*J. K. Small*); Dickey's Creek and Hungry Mother Creek (*Mrs. Britton and Miss*

¹ Organographie der Pflanzen 275. 1898.

Vail). North Carolina: Blowing Rock Mountain (*J. K. Small*); Hog Back Mountain (*H. A. Green*).¹

In its dioicous inflorescence *M. crassipilis* agrees with *M. furcata*, and the costa is built up on the same type in the two species. The thallus of *M. crassipilis*, however, is more or less convex, the postical surface of the wings is usually densely pilose, and the marginal cilia (although occurring singly) are not displaced to the postical surface. The cells of the thallus, also, average less than $35\ \mu$ in diameter, whereas in *M. furcata* they average more than $35\ \mu$. But the most remarkable structures found in *M. crassipilis* are the gemmae. These are frequently produced in great abundance and arise on the antical surface of the wings and not on the postical surface as Lindberg described. Each gemma is in the form of a circular disc, one cell thick throughout and usually showing a single two-sided apical cell. The surface of the gemma is smooth but the margin usually bears a few straight cilia, irregularly distributed. The gemmiparous branch is not strongly modified in appearance, but the development of the gemmae tends to limit its growth. Lindberg describes the female branch as being smooth, but it shows this condition only when immature; as it grows older it becomes sparingly setose or pilose along the margin and occasionally develops a very few short surface cilia. The antheridial branch is smooth, and the calyptra and sporophyte are still unknown.

According to Lindberg *M. crassipilis* is to a certain extent intermediate between *M. furcata* and *M. dichotoma* (Swartz) Nees, a tropical species known from the West Indies and Brazil. In *M. dichotoma*, which is rather more robust than *M. crassipilis*, the costa is bounded above by from three to five cells and below by from five to eight, the cells average about $50\ \mu$ in diameter, the cilia are longer and more abundant, and the female branch is pilose. The gemmae of *M. dichotoma*, so far as Lindberg describes them, are similar to those of *M. crassipilis* and also arise from the surface of the thallus-wings.

3. *PELLIA FABRONIANA* Radzi, Mem. Soc. Ital. delle Sci. in Modena **18**: 49. pl. 7. f. 5. 1818. *Jungermannia calycina* Tayl.; Mackay, Fl. Hibern. **2**: 55. 1836. *Pellia calycina* Nees, Naturgeschichte der europ. Leberm. **3**: 386. 1838. Wet bank of brook; Newfane, Vermont (*A. J. Grout*). The species is sometimes known as *P.*

¹ The specimens from several of these localities have been listed elsewhere as *M. conjugata*. See Mem. Torrey Club **4**: 195. 1893. Also Adirondack League Club Year Book for 1904: 45.

endiviaefolia (Dicks.) Dumort. The original *Jungermannia endiviaefolia* of Dickson (Pl. Crypt. Brit. 4: 19. 1801) was apparently based on an old figure of Vaillant, and there is so much uncertainty about it that most of the recent European writers have given it up in favor of the later name of Raddi, about which there seems to be no doubt. In the Bryologist for May, 1905, Grout refers his specimens with some hesitation to *P. Neesiana* (Gottscche) Limpr. Since they are entirely destitute of mature capsules their determination is beset with difficulties and we are obliged to rely on characters derived from the thallus. Fortunately the internal cells of the median region afford structural differences which are available even in sterile material. In *P. Neesiana*, as well as in *P. epiphylla* (L.) Corda, many of these cells show vertical bands of thickening in their walls, and these bands are often pigmented with purple or red. They can be most easily demonstrated by cutting longitudinal sections through the thallus, although they are sometimes seen almost as clearly in transverse section. In *P. Fabroniana* bands of this character are not developed, the cells of the thallus being everywhere thin-walled. Since Grout's specimens are also destitute of these bands they are here referred to *P. Fabroniana* instead of to *P. Neesiana*. Comparatively few of the publications relating to *Pellia* make use of these bands in distinguishing the species, although attention was called to them many years ago by Leitgeb.¹ C. Müller,² however, emphasizes their importance and gives an excellent figure of them as they appear in *P. epiphylla*.

4. *PELLIA NEESIANA* (Gottscche) Limpr.; Cohn, Krypt.-Flora von Schlesien 1: 329. 1876. *Pellia epiphylla*, forma *Neesiana* Gottscche, Hedwigia 6: 69. 1867. On wet rocks; Wintergreen Falls, Hamden, Connecticut (A. W. E.). The species is probably widely distributed in New England but is easily confused with *P. epiphylla*. All three species of the genus are common in Europe and Asia. The striking difference in the structure of the thallus, which separates *P. Neesiana* from *P. Fabroniana*, is supplemented by still more striking differences in the structure of the capsule. In *P. Neesiana* the cells forming the inner layer of the capsule-wall develop local wall-thickenings in the form of incomplete rings; the elater-bearers at the base of the capsule are 15–25 μ in diameter and number from 20 to 30; while the elaters

¹ Unters. über Lebermoose 3: 53 (footnote). 1877.

² Rabenhorst's Kryptogamen-Flora 6: 9. f. 2. 1906.

themselves are about $8\ \mu$ in diameter and show two spirals. In *P. Fabroniana*, on the other hand, the inner layer of the capsule-wall is without local thickenings; the elater-bearers are only $5-8\ \mu$ in diameter and number about 100; while the elaters themselves are $10-12\ \mu$ in diameter and show three or four spirals. The differences in the structure of the capsule are fully discussed by Jack.¹

The relationships between *P. Neesiana* and *P. epiphylla* are very close indeed, both thallus and capsule showing the same structure in the two species. There are, however, two important differences between them. In *P. Neesiana* the inflorescence is dioicous, and the involucre is in the form of a short but complete sheath with an irregular margin. In *P. epiphylla* the inflorescence is monoicous (paroicous), and the involucre is represented by a short flap of the thallus on the basal side of the sporophyte. *P. Fabroniana* agrees with *P. Neesiana* in being dioicous and in developing a tubular involucre, but the latter is long and extends beyond the calyptra, whereas in *P. Neesiana* the calyptra extends beyond the involucre at maturity. The differences just noted are very clearly shown by C. Müller¹ in a series of schematic figures.² It will be seen from the foregoing statements that sterile specimens of *Pellia* with bands of thickening in the internal cells of the thallus are quite indeterminable.

5. CEPHALOZIELLA ELACHISTA (Jack) Schiffn. Lotos **48**: 338. 1900. *Jungermannia elachista* Jack; Gottsche & Rabenhorst, Hep. Europ. 574 (with figures). 1873. *Cephalozia elachista* Lindb. Acta Soc. Sci. Fenn. **10**: 502. 1875. On a decayed stump in a bog; Reading, Massachusetts (*C. C. Kingman*). Not before recorded for America. Widely distributed in Europe but apparently rare. This delicate little species seems to be confined to bogs and is characterized primarily by an autoicous inflorescence and by distant, sparingly dentate leaves. The plant is pale green in color and the prostrate stems are sparingly branched. The deeply bifid leaves are almost transversely inserted and tend to spread widely from the axis. Their lobes are slender and sharp-pointed, usually from four to six cells long and from two to four cells wide at the base, and they are frequently inflexed at the apex. The leaf-cells have a smooth cuticle and are thin-walled; in the middle of the lobes they measure $19-24\ \mu$ in length

¹ Flora **81** (Ergänz.-Band): 1-16. pl. 1. 1895.

² Rabenhorst's Kryptogamen-Flora **6**: 369. f. 218. 1908.

by about $12\ \mu$ in width. The marginal teeth are sometimes absent altogether, and it is rare to find more than one tooth on a lobe, consisting usually of a single projecting cell. The underleaves are minute and are not always present. The lobes of the perigonial bracts are toothed, but the teeth are more numerous and better developed on the perichaetial bracts; they differ in length and extend irregularly in various directions. The perianth is long and in the form of a triangular prism, minutely crenulate at the mouth from projecting cells. Gemmae are frequently present and are usually borne at the tips of more or less elongated branches where they form spherical masses. They are elliptical in form with thin walls and rounded ends; they measure about $17 \times 9\ \mu$ and are usually bicellular. As a rule it is quite impossible to distinguish leaves in the gemmiparous region, although this is not always the case.

The original specimens of *Jungermannia elachista*, collected by Jack at Salem in Baden and distributed by Gottsche and Rabenhorst, are badly mixed with a second species of *Cephaloziella*, which Schiffner refers to *C. byssacea* (Roth) Schiffn. (= the *C. divaricata* of many authors). In the set of the Hepaticae Europaeae in the Eaton herbarium, No. 574 is made up almost entirely of this second species, but the few sterile stems which seem referable to *J. elachista* agree with the Massachusetts specimens. The range of variation and the relationships of the species are not yet clearly understood.

6. CEPHALOZIELLA HAMPEANA (Nees) Schiffn. Oesterr. Bot. Zeitschr. **54**: 256. 1904. *Jungermannia Hampeana* Nees, Naturgeschichte der europ. Leberm. **3**: 560. 1838. *Cephaloziella trivialis* Schiffn. Lotos **48**: 341. 1900. *C. erosa* Limpr.; Warnstorff, Kryptogamenfl. der Mark Brandenburg **1**: 233. f. 6. 1902. *Cephalozia erosa* Massal. Malpighia **21**: 36. 1907. On a rotten log in a swamp; near Schoodic Lake, Piscataquis County, Maine (*A. W. E.*). On moist rocks; Naugatuck, Connecticut (*A. W. E.*), sterile; specimens with male and female flowers afterwards collected in the same locality by Miss Lorenz. Not before recorded from North America but widely distributed in Europe. The above synonymy is mostly quoted from Schiffner, who suggests that it be accepted somewhat tentatively, the relationships between the present species and the closely allied *C. bifida* (Schreb.) Schiffn. being not yet definitely established. The specimens which are here referred to *C. Hampeana* agree closely with the type material of *C. trivialis*, collected by Dreesen

near Bonn and distributed in Gottsche and Rabenhorst's *Hepaticae Europaeae*, No. 598, under the name *Jungermannia divaricata*. They are deep green in color with occasionally a tinge of brownish. The stems are sparingly and irregularly branched, while the leaves are distant and widely spreading with broad triangular lobes acute at the apex. The lobes are usually from eight to twelve cells long and from six to ten cells wide at the base; their margins are either entire or vaguely and irregularly crenulate. The leaf-cells average about $15 \times 11 \mu$ and have thin walls. Underleaves may or may not be present. The inflorescence is autoicous. The female branch varies more or less in length but is usually elongated, and the leaves gradually increase in size toward the archegonia. The lobes of the bracts are sometimes entire or nearly so and sometimes minutely and irregularly denticulate. The lobes of the perigonial bracts also show minute teeth or crenulations occasionally but are more frequently entire. Gemmae are sometimes very abundant and closely resemble those described for *C. elachista*.

As thus described *C. Hampeana* is a variable species agreeing with *C. elachista* in its autoicous inflorescence. It is, however, more robust, the lobes of its leaves are broader and less sharp-pointed, the leaf-cells are smaller, and the margins of both leaves and bracts are less toothed. When Schiffner first published his *C. trivialis* he suggested that the *Cephalozia divaricata* described by Heeg¹ might also be regarded as a synonym. Warnstorff² considers this open to doubt from the fact that Heeg's plant seems to be distinctly dioicous, and Schiffner has made no further allusions to the matter in his more recent papers. Heeg's species differs from the true *C. divaricata*, as understood by Schiffner and others, and has not yet been definitely reported from North America. The various ways in which *C. divaricata* is interpreted by European botanists is discussed by Miss Lorenz³ in a recent publication.

7. CALYPOGEIA NEESIANA (Massal. & Carest.) C. Müll. Frib.; Loeske, Verhandl. Bot. Ver Prov. Brandenburg **47**: 320. 1905. *Kantia Trichomanis*, β *Neesiana* Massal. & Carest. Nuovo Giorn. Bot. Ital. **12**: 351. pl. 11, f. 3. 1880. *Calypogeia Trichomanis*, var. *Neesiana* C. Müll. Frib. Beih. zum Bot. Centralbl. **10**: 217. 1901. *Cincinnulus Trichomanis*, var. *Neesiana* C. Müll. Frib. *ibid.* **13**: 97.

¹ Verhandl. der k. k. zool.-bot. Gesellsch. in Wien **43**: 95. 1893.

² Kryptogamenfl. der Mark Brandenburg **1**: 227. 1902

³ Bryologist **12**: 25–27. 1909.

1902. *Kantia Neesiana* Migula, Kryptogamen-Fl. von Deutschland, etc. **1**: 462. 1904. *Calypogeia integristipula* Steph. Bull. de l'Herb. Boissier II. **8**: 662. 1908. On rotting logs in a cedar bog; Monkton, Vermont (*L. W. Riddle*). Not before recorded from North America but probably with an extensive range. Widely distributed in Europe and northern Asia. Although *C. Neesiana* has been considered a mere form or variety of *C. Trichomanis* until very lately, European writers are now showing a marked tendency to accept it as a valid species. It is a robust plant, equalling *C. Trichomanis* in size, and is characterized by oval leaves, rounded or truncate at the apex, and by large orbicular or reniform underleaves, usually quite undivided but sometimes emarginate or bluntly bifid to about one fourth, these various conditions being often found on a single stem. The underleaves are further distinguished by their more or less elongated cells with thin walls. Unfortunately, as in other members of this difficult genus, many of the slender and sterile stems fail to show the characters of the species clearly, but well developed plants are not difficult to determine. In a recent paper Meylan¹ discusses *C. Neesiana* fully and concludes that its characters are much more constant than those of *C. fissa* Raddi, which most botanists now recognize as a species; he emphasizes, however, its very close relationship to *C. Trichomanis*.

8. *SCAPANIA GLAUCEOCEPHALA* (Tayl.) Aust. Bull. Torrey Club **6**: 85. 1876. *Jungermannia glaucocephala* Tayl. Lond. Jour. Bot. **5**: 277. 1846. *Scapania Peckii* Aust. Proc. Acad. Philadelphia for 1869: 218. On a rotten log; Waterville, New Hampshire (*Miss Lorenz*). Although the present plant has been quoted from New England this is the only definite station which the writer is able to cite. The species is peculiar to North America and its known range extends westward to Minnesota and northward into Canada. Its most important peculiarities have already been noted in connection with the closely related *S. apiculata* Spruce,² but it may be well to allude to them briefly again. It is characterized especially by its upright flagelliform shoots bearing gemmae in abundance. These are oval and usually unicellular and are deeply pigmented with brown or purple. The leaves upon which the gemmae are borne have thick-walled cells without distinct trigones. The normal leaf-cells are much smaller

¹ Rev. Bryol. **36**: 53-58. 1909.

² RHODORA **9**: 71. 1907.

and are thin-walled throughout or with very minute trigones. The gemmiparous shoots bear a marked resemblance to those found in *Sphenolobus Hellerianus* but are considerable larger. According to C. Müller¹ the perianth is still unknown. Austin, however, describes it for his *S. Peckii*, and it is figured by Pearson.² The species is evidently in need of further study.

The following represent additions to local state floras not included in the preceding notes:—*Calypogeia tenuis*, Reading, Massachusetts (C. C. Kingman); *Cephalozia pleniceps*, Willoughby, Vermont (Miss Lorenz); *Cephaloziella myriantha*, Biddeford Pool, Maine (Miss Lorenz); *Cololejeunea Biddlecomiae*, Buckfield, Maine (J. A. Allen); *Lepidozia sylvatica*, Cape Elizabeth, Maine (A. W. E.); *Lophozia confertifolia*, Mount Mansfield, Vermont (Miss Lorenz); *L. longiflora*, Mount Lafayette and Carragain Pond, New Hampshire (Miss Lorenz); *Scapania gracilis*, Madison, New Hampshire (H. H. Bartlett); *Sphenolobus Hellerianus*, Willoughby, Vermont (Miss Lorenz); *S. Michauxii*, Mount Greylock, Massachusetts (A. LeRoy Andrews). From specimens sent by C. C. Kingman the Massachusetts records for *Chiloscyphus pallescens* and *Anthoceros punctatus* may now be marked with the sign “ + ”.

The census of New England Hepaticae now stands as follows: Total number of species recorded, 155; number recorded from Maine, 106; from New Hampshire, 120; from Vermont, 90; from Massachusetts, 85; from Rhode Island, 64; from Connecticut, 110; common to all six states, 43.

YALE UNIVERSITY.

¹ Nova Acta Acad. Caes. Leop. Carol. **83**: 264. 1905.

² List of Canadian Hepat. *pl. 8.* 1890.

AN ALGOLOGICAL PROPHECY FULFILLED.

F. S. COLLINS.

I HAVE lately taken considerable interest in those forms of algae that show special adaptations to particular conditions, epi- or endophytic, epi- or endozoic habitat, and the like, of which many are known, both fresh water and marine, and doubtless many more will be discovered. One for which I have been looking is *Dermatophyton radians* Peter, a green alga that forms a firm crust on the backs of turtles, penetrating into the crevices; it was first found in Europe, and has once been found in this country. For the last two or three years I have waylaid turtles at many ponds, but have found no trace of the alga; the shells have been bare and smooth. But one day in June last, in Tewksbury, Massachusetts, I saw a turtle near the edge of a pond, with a distinct green growth on the shell. I proceeded towards him with the utmost caution, as turtles are not easily taken unaware, but soon a sense, other than sight, notified me that he was not likely to escape; he was no ways superior in appearance to other mud turtles, and yet it would hardly be incorrect to speak of him as unapproachable. I succeeded in scraping off some of the growth, which as I had supposed was a green alga, but it certainly was not the *Dermatophyton*; the substance was much softer. Only when I reached home and examined it with the microscope did I recognize it; it was *Chaetomorpha Chelorum*, the plant that I described in RHODORA, Vol. IX, p. 199, from material sent me from Michigan, where Dr. Hankinson found it on two species of turtle. Now in connection with my description I referred to what Lagerheim said, when describing *C. herbipolensis*, the first, and until my note the only certain fresh water species of this genus; that the desmids that he had studied on specimens of aquatic phanerogams, collected long ago by B. D. Greene, indicated that the algal flora of Massachusetts was of almost a tropical character, and that fresh water species of *Chaetomorpha* were to be expected here. The characterization of Massachusetts as subtropical strikes one rather oddly, but here is this second station for *C. Chelorum*, the same Round Pond where Greene collected the plants that Lagerheim examined in the herbarium in Sweden, and from which he published his very valuable list of desmids; I had been exploring many ponds all over New Eng-

land, but only at this one spot had I found the *Chaetomorpha*; there could hardly be a more perfect fulfillment of what seemed an improbable prophecy.

MALDEN, MASSACHUSETTS.

RUPTURE OF THE EXOPERIDIUM IN CALOSTOMA RAVENELII.

HARLEY HARRIS BARTLETT.

THE most interesting find on a recent collecting trip to Falls Church, Virginia, in company with Dr. Heinrich Hasselbring, was a colony of *Calostoma Ravenelii* (Berk.) Massee. There were between thirty and forty plants, in all stages of development, growing up through a clump of moss in moderately damp, chestnut woods. The long coralline bases of the fungus were imbedded in loose, sandy soil underneath the moss. Most of the peridia had pushed entirely through the moss, but a few had reached maturity under ground.

The method of rupture of the exoperidium in *Calostoma Ravenelii* seems never to have been satisfactorily described, although the species is found not uncommonly near Washington, D. C., and elsewhere. The following quotations from recent treatments of *Calostoma* (*Mitremyces*), bear upon this point:—

“ . . . exoperidium remaining attached to the ochraceous endoperidium in the form of irregular warts or scales.”

“ Although Morgan considers the species [*C. Ravenelii*] synonymous with *M. lutescens*, it appears to differ in . . . the peculiar mode of rupture of its exoperidium, which remains attached in scale-like fragments all over the surface of the endoperidium, the Herbarium Curtis specimens agreeing in this respect with those of Berkeley, as figured by Massee, . . . ”

(Burnap, Bot. Gaz. xxiii (1897) p. 190.)

“ Professor Beardsley writes me: ‘ *Mitremyces Ravenelii*, as I have found it in a dozen stations at Asheville, has no gelatinous coat, but is always covered with a scurfy coat which breaks away from the base first, the last piece separating like a cap from the apex.’ ”

"Exoperidium breaking into very small flakes, which usually dry up and remain attached to the inner peridium....At least in our herbarium specimens, this is a very constant character....Endoperidium....usually rough with adnate scales, remains of the exoperidium."

(Lloyd, Myc. Notes, No. 13 (1903), pp. 123 & 126.)

"The outer peridium of *Mitremyces* is of the nature of a more or less gelatinous volva,.... It presents three types. In *cinnabarinus*, *insignis* and *lutescens*, it separates from the endoperidium leaving the latter relatively smooth. In *Ravenelii*, *Tylerii*, *orirubra* and *Junghuhni* it breaks into areas and dries more or less as scales on the endoperidium. In *fuscus* it falls off as a cap."

(Lloyd, Myc. Notes, No. 20 (1905), p. 238.)

In essentials, my own observations at Falls Church confirm those of Professor Beardsley. In dry weather, at least, the exoperidium is not noticeably gelatinous. It is thinnest near the foot-stalks, and thickest in a zone around the mouth. As a result of this differentiation the lower part has too little tensile strength to cohere when shrinkage takes place at maturity. Instead, it breaks into small patches which adhere to the endoperidium,—a character well shown by herbarium specimens. The upper part, however, is thicker and tougher, so that it tears away entire from the upper third or fourth of the endoperidium and drops off as a cap, or as a stellately lacinate plate, leaving a glabrous zone around the mouth. There was a detached cap lying near each mature plant in the colony of *Colostoma Ravenelii* at Falls Church. The brilliant coloring of these caps, inside up on the green moss, was what attracted my attention to the colony. They are vermillion at the center, surrounded by strongly contrasting yellow.

* BUREAU OF PLANT INDUSTRY,
U. S. Department of Agriculture,
Washington, D. C.

PLANTS NEW TO VERMONT.—The Vermont Botanical Club held a two day's field meeting July 6-7, 1909, with headquarters at Burlington. The first day was given to Au Sable Chasm, New York, and the second day to the interesting botanizing regions about Burlington, *viz*: the sandy beaches and rocky bluffs of Lake Champlain, the old river bed at High Bridge, and Woodwardia Pond at Fort Ethan Allen.

The last day, along the Rutland Railroad tracks a clump of perhaps a dozen plants of the low hop clover, *Trifolium procumbens* L., was found by myself. Mr. George L. Kirk later reported the finding of one plant of this clover in the lumber yards, on the same trip.

Later in July, I found six good-sized plants of a western evening primrose, *Oenothera serrulata* Nutt., along the same track. These two are plants new to the state.

A new station for the meadow rue, *Thalictrum confine* Fernald, reported by Dr. J. A. Cushman from North Hero¹ and found at Gardner's Island, Lake Champlain, by Mr. Kirk, was rediscovered at Burlington Bay the second day of September. Prof. M. L. Fernald, to whom I sent specimens, says, "It is singularly undeveloped for this season of the year. On the St. John and the St. Lawrence, it flowers in June and July and the fruit is usually too ripe to collect by the middle of August. It will be interesting to know whether it develops good fruit at this season of the year."

The latter part of September *Gypsophila muralis* L. and *Sedum telephiooides* Michx. were found in Colchester. The first was abundant in what seemed to have been a garden or cultivated place and of the last one clump had escaped to the roadside. Both were growing in sandy soil.— NELLIE F. FLYNN, Burlington, Vermont.

A REMARKABLE FORM OF *KALMIA LATIFOLIA*.— While returning from a botanical excursion with members of the Springfield Botanical Club in June, 1907, the writer with others noticed a curious form of *Kalmia* growing beside the road in Leverett not far from Mt. Toby. The corolla, instead of being of the customary saucer shape, was divided completely into five or more narrowly linear or in some cases even thread-shaped petals, giving the plant a unique appearance.

Some years ago a similar plant was discovered by Miss Bryant at South Deerfield. These were submitted to Dr. Asa Gray, who described them under the title "Dialysis with Staminody in *Kalmia latifolia*," in the American Naturalist, Vol. IV, pages 373 and 374, 1871.

Prof. C. S. Sargent, in "Garden and Forest," Vol. II, pages 452 and 453, also describes and figures this curious monstrosity, which was procured from Deerfield and cultivated in the Arnold Arboretum.

¹ Vt. Bot. Cl. Bull. iii. 54 (1908).

He mentions that the plant produces seed freely in cultivation and can be propagated by grafting on *Kalmia*.

Dr. Gray mentions the resemblance of some of these petals to filaments, and says this resemblance goes further, for most of them are actually tipped with an imperfect anther. This we did not notice in our specimens.

Undoubtedly this sport is not confined to one locality, and further search may reveal other plants of this interesting form.—GEORGE E. STONE, Amherst, Massachusetts.

SCIRPUS LINEATUS IN NEW HAMPSHIRE.—On July 20, while collecting at Manchester, N. H., in a damp field where species and forms of *Scirpus*, especially of the *cyperinus* group, are abundant, I found a single tuft of *S. lineatus* Michx, not as yet reported, I think, east of Vermont. Among indigenous plants of the locality are *Lycopodium inundatum* L., *Eleocharis tenuis* (Willd.) Schultes., *Carex stipata* Muhl., *C. stellulata* Good., *Juncus filiformis* L., *Spiranthes cernua* (L.) Richard., *Liparis Loeselii* (L.) Richard. and *Drosera rotundifolia* L. Doubtless the species may be found elsewhere in New Hampshire where similar ecological conditions prevail.—F. W. BATCHELDER, Manchester, New Hampshire.

Vol. 11, no. 129, including pages 165 to 180 and plates 80 and 81, was issued
29 September, 1909.

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